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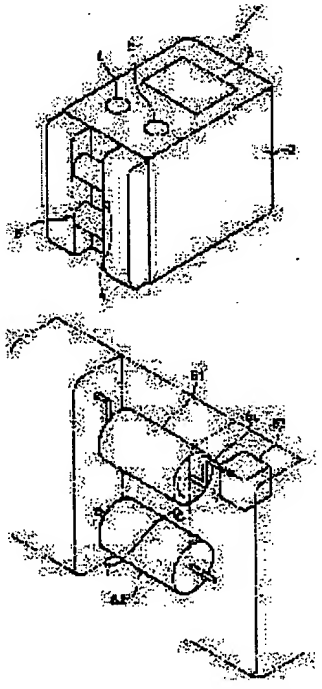
(54) BLOOD ANALYZING DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To easily collect the blood by a method independent from suction and easily and quickly analyze the blood by combining a blood collecting mechanism, a puncture member, an electrode, and a display part together, and providing a means for pushing the blood from the skin on the blood collecting mechanism.
SOLUTION: When the blood is collected from a finger tip in order to measure a substance to be detected in the blood by use of a blood collecting device 1, a main switch 4 is first put on, and the belly part of the finger tip, for example, is pushed onto both rollers 61, 62. A puncture needle shooting switch 5 is put on, and a puncture needle is protruded from the puncture part 7 between both the rollers 61, 62 to injure the skin of the finger tip. A motor 63 is also driven to rotate a shaft 64 and one roller 6, the space with the other roller 62 is narrowed to nip the skin, so that the blood is pushed out. Further, the pushed blood is brought into contact with a blood collecting member to suck the blood into its hollow part, and then brought into contact with an enzyme ink 94 and both electrodes. The substance to be detected in the blood is detected and measured, and displayed on a display part 3.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] Hemanalysis equipment characterized by having a means by which provide a blood collecting device, a puncture member, an electrode, and a display, and said blood collecting device extrudes blood from the skin.
[Claim 2] Hemanalysis equipment according to claim 1 characterized by said puncture member and electrode being a cartridge-type.
[Claim 3] Hemanalysis equipment according to claim 1 or 2 characterized by installing said electrode in the location which contacts the blood extruded from the skin in the condition that the body was equipped with hemanalysis equipment.
[Claim 4] Hemanalysis equipment according to claim 2 or 3 which the base of a cartridge has tabular, and the puncture member is prepared in one side possible [sliding], and is characterized by arranging the electrode in an another side side.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to the hemanalysis equipment which possesses all of a blood collecting device, a puncture member, an electrode, and a display especially about the hemanalysis equipment which can analyze the detected matter contained in blood, such as the blood sugar level.

[Translation done.]

PRIOR ART

[Description of the Prior Art] Conventionally, when the blood sugar level etc. was measured, it was carrying out by making the blood drop adhere to the electrode with which attached the blemish to the fingertip using the reusable puncture instrument (Lancet), pressed out the blood drop from there, picked out from the wrapping material, and the sensor was equipped. However, when the reusable puncture instrument and the sensor have dissociated in this way, there are many processes which are required in performing a series of actuation.

[0003] Then, the blood collecting machine (refer to JP,5-95937,A and JP,5-95938,A) with which the blood collecting machine (refer to JP,5-111476,A, JP,6-311980,A, JP,6-327655,A, and JP,7-51251,A) with which the medical-application system (refer to JP,61-286738,A) by which the reusable puncture needle, the capillary tube, and the sensor were united, a reusable puncture needle, a suction implement, and ****** were united and a reusable puncture needle, a suction implement, ******, and a sensor were united was proposed.

[0004] However, the blood collecting approach in these instruments It is what is depended on the method with which all are decompressed by the syringe, a syringe, etc. and attract blood. unless it sticks the base of a cylinder on the skin, it cannot decompress, but when the cylinder below phi1.5 mm is used, blood plugs up a hole with the former, there is a fault of bleeding stopping, and the structure of a syringe is complicated in the latter -- etc. -- there was a fault.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the convenient hemanalysis equipment which has the device it collecting blood by the approach by suction, and possesses a puncture member, an electrode, and a display.

[Translation done.]

MEANS

[Means for Solving the Problem] By adopting the blood collecting device in which this invention person etc. has the means which extrudes blood from the skin in view of the above-mentioned technical problem as a result of wholeheartedly research, even if not based on the suction approach, it could collect blood easily, and a header and this invention were completed for the ability of blood to be analyzed that it is simple and quickly.
[0007] That is, this invention possesses a blood collecting device, a puncture member, an electrode, and a display, and is hemanalysis equipment with which said blood collecting device is characterized by having the means which extrudes blood from the skin. Moreover, this invention is the above-mentioned hemanalysis equipment characterized by the puncture member and the electrode being a cartridge-type.
[0008] Furthermore, this invention is the above-mentioned hemanalysis equipment characterized by installing said electrode in the location in contact with the blood extruded from the skin in the condition that the body was equipped with hemanalysis equipment. The base of a cartridge has tabular, the puncture member is prepared in one side possible [sliding], and this invention is the above-mentioned hemanalysis equipment characterized by arranging the electrode in an another side side further again.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the hemanalysis equipment which possesses all of a blood collecting device, a puncture member, an electrode, and a display especially about the hemanalysis equipment which can analyze the detected matter contained in blood, such as the blood sugar level.
[0002]
[Description of the Prior Art] Conventionally, when the blood sugar level etc. was measured, it was carrying out by making the blood drop adhere to the electrode with which attached the blemish to the fingertip using the reusable puncture instrument (Lancet), pressed out the blood drop from there, picked out from the wrapping material, and the sensor was equipped. However, when the reusable puncture instrument and the sensor have dissociated in this way, there are many processes which are required in performing a series of actuation.
[0003] Then, the blood collecting machine (refer to JP,5-95937,A and JP,5-95938,A) with which the blood collecting machine (refer to JP,5-111476,A, JP,6-311980,A, JP,6-327655,A, and JP,7-51251,A) with which the medical-application system (refer to JP,61-286738,A) by which the reusable puncture needle, the capillary tube, and the sensor were united, a reusable puncture needle, a suction implement, and ****** were united and a reusable puncture needle, a suction implement, ******, and a sensor were united was proposed.
[0004] However, the blood collecting approach in these instruments It is what is depended on the method with which all are decompressed by the syringe, a syringe, etc. and attract blood. unless it sticks the base of a cylinder on the skin, it cannot decompress, but when the cylinder below phi1.5 mm is used, blood plugs up a hole with the former, there is a fault of bleeding stopping, and the structure of a syringe is complicated in the latter -- etc. -- there was a fault.
[0005]
[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the convenient hemanalysis equipment which has the device it collecting blood by the approach by suction, and possesses a puncture member, an electrode, and a display.
[0006]
[Means for Solving the Problem] By adopting the blood collecting device in which this invention person etc. has the means which extrudes blood from the skin in view of the above-mentioned technical problem as a result of wholeheartedly research, even if not based on the suction approach, it could collect blood easily, and a header and this invention were completed for the ability of blood to be analyzed that it is simple and quickly.
[0007] That is, this invention possesses a blood collecting device, a puncture member, an electrode, and a display, and is hemanalysis equipment with which said blood collecting device is characterized by having the means which extrudes blood from the skin. Moreover, this invention is the above-mentioned

hemanalysis equipment characterized by the puncture member and the electrode being a cartridge-type.
[0008] Furthermore, this invention is the above-mentioned hemanalysis equipment characterized by installing said electrode in the location in contact with the blood extruded from the skin in the condition that the body was equipped with hemanalysis equipment. The base of a cartridge has tabular, the puncture member is prepared in one side possible [sliding], and this invention is the above-mentioned hemanalysis equipment characterized by arranging the electrode in an another side side further again.
[0009]
[Function] With the hemanalysis equipment of this invention which has the device in which it collects blood with a knockout means, and possesses a puncture member, an electrode, and a display The problem that it cannot decompress unless it sticks the base of the problem accompanying the approach of collecting blood by suction, i.e., a cylinder, on the skin, When the cylinder below phi1.5 mm is used, blood plugs up a hole. The problem that bleeding will stop, the problem that the structure of a syringe is complicated, etc. are solvable, and a general user cannot need skill, but can collect blood easily and quickly, and can analyze the detected matter.
[0010] Moreover, if the puncture member and electrode in hemanalysis equipment of this invention are made into a cartridge-type, since they can be made throwing away in one, bacterial infection etc. can be prevented. Furthermore, since the blood which bled installing the electrode in the hemanalysis equipment of this invention in the location in contact with the blood extruded from the skin and by arranging a puncture member in the background of a base prepared possible [sliding] contacts an enzyme and an electrode immediately, it is not necessary not to establish a means to contact especially blood to an electrode etc., a series of actuation processes which analysis takes can reduce, and inspection can substitute for one-touch.
[0011]
[Example] Hereafter, this invention is explained to a detail with reference to a drawing. The perspective view of hemanalysis equipment with an example of this invention is shown in drawing 1 . This hemanalysis equipment 1 has housing 2, the display 3, the main switch 4 and the reusable puncture needle discharge switch 5 which were formed in the field of 1 of that housing 2, and the puncture section 7 which extruded and was prepared between two rollers which were formed in other fields of housing 2, and which the roller section 6 and the extrusion roller section 6 have.
[0012] Drawing 2 is drawing having shown the extrusion roller section 6 in the detail. The extrusion roller section 6 has the roller 61 driven by the motor 63, and the roller 62 which can be rotated. The shaft 64 of a roller 61 has become crank-like, and a roller 61 is offset and installed. In order to extrude blood from the skin with these two rollers 61 and 62, as for rollers 61 and 62, it is desirable to produce from the ingredient with large coefficient of friction to the skin.
[0013] As shown in drawing 3 , the reusable puncture needle 71 is installed in the puncture section 7, and this reusable puncture needle 71 slides on the inside of the blood collecting member 9 of the shape of an rectangular pipe held in the sleeve 8. This reusable puncture needle 71, the blood collecting member 9, and a sleeve 8 constitute the dismountable cartridge 10 from housing 2. Therefore, it will become very advantageous for reasons of sanitation by making this cartridge 10 throwing away.
[0014] A reusable puncture needle 71 is hammered out with the hammer 72 connected with the spring 73, and projects from the puncture section 7. What is necessary is just to establish a means which operates that what is necessary is just to perform actuation of a hammer 72 with a conventional method when the reusable puncture needle discharge switch 5 is pushed. In addition, as shown in drawing 4 , the spring 74 for returning root Motobe of a reusable puncture needle 71 the hammered-out reusable puncture needle 71 is installed.
[0015] Two electrodes 92 and 93 are formed in the wall 91 which constitutes the rectangular pipe of the blood collecting member 9, and enzyme ink 94 is applied to one electrode 93 (refer to drawing 5). These electrodes 92 and 93 are connected to a sensor (not shown) through a sleeve 8. When various things can be chosen according to the detected matter in blood, for example, it measures the blood sugar level, the

ink constituent containing glucose oxidase etc. can be used for enzyme ink 94.

[0016] The blood collecting member 9 is installed in the location where the blood drop extruded from the skin with rollers 61 and 62 contacts, and the centrum 95 of the blood collecting member 9 is set as size in which a blood drop is absorbed by capillarity. The blood collecting member 9 is produced with the ingredient which performs hydrophilic processing to the interior of the blood collecting member 9, or has a hydrophilic property preferably. How to measure the detected matter in blood is explained using the above-mentioned hemanalysis equipment. Here, although the case where it collects blood from a fingertip is mentioned as an example and explained, this invention is not limited to this.

[0017] First, a main switch 4 is turned on and the part of the antinode of a fingertip is pressed against rollers 61 and 62. In this condition, the reusable puncture needle discharge switch 5 is turned on. If the reusable puncture needle discharge switch 5 is turned on, the hammer 72 energized with the spring 73 will hammer out a reusable puncture needle 71. After it projects the hammered-out reusable puncture needle 71 from the puncture section 7 among rollers 61 and 62 and it damages the skin of a fingertip, it returns to the original location according to an operation of a spring 74. A motor 63 drives with it and a shaft 64 and a roller 61 rotate. Since the roller 61 is offset, spacing with a roller 62 becomes narrow by rotating. Therefore, rollers 61 and 62 will put the skin and will extrude blood from the skin which got damaged as shown in drawing 6 .

[0018] The extruded blood drop contacts the blood collecting member 9, and is absorbed by the centrum 95 of the blood collecting member 9 by capillarity. The sucked-in blood contacts enzyme ink 94 and electrodes 92 and 93, and the detected matter in blood serves as an electrical signal, it is sent to a sensor, and measured value is shown in a display 3. According to the hemanalysis equipment of such this invention, a series of actuation processes can be reduced and inspection can be substituted for one-touch. Moreover, since this equipment possesses all of a blood collecting device, a puncture member, an electrode, and a display, a general user does not need skill but can use it easily and quickly. Furthermore, with the hemanalysis equipment of this invention, not only the blood sugar level but the various matter in blood can be analyzed by changing the class of enzyme ink to be used.

[0019] As mentioned above, although this invention was explained to the detail using the drawing, this invention can perform various modification, unless it deviates from the thought of this invention, without being limited to this. For example, another example from which the drive of a blood collecting device, a puncture member, an electrode, and a puncture member differs is shown in drawing 7 and drawing 8 . tabular base 101 with which the cartridge 10 was held into the sleeve 8 and the sleeve 8 as shown in drawing 7 from -- it is constituted. Base 101 In one side, it is the puncture cutting edge 102. It is prepared possible [sliding] (refer to drawing 8 (a) and (b)), and electrode 103a and electrode lead 103b are arranged in the another side side (refer to drawing 8 R> 8 (c)). base 101 Height 104 having -- electrode lead 103b -- this height 104 up to -- it extends and electrode 103a is formed. In addition, base 101 And puncture cutting edge 102 It is drawing 8 (d) about the perspective view seen from back. It is shown.

[0020] this example -- puncture cutting edge 102 Arm member 106 minding -- electromagnet 107 it drives -- having -- base 101 Height 104 from -- it projects. Electromagnet 107 By turning on and off of a power source, it drives by the interaction with the magnet (not shown) installed into housing. base 101 **** -- flat spring 105 it installs -- having -- **** -- arm member 106 Puncture cutting edge 102 projected and carried out It is made to retreat. Puncture cutting edge 102 projected in this cartridge 10 The blood drop which damaged the skin and was extruded with the roller etc. is a height 104. Electrode 103a and enzyme ink (not shown) which were prepared are contacted, and it is changed into an electrical signal.

[0021] moreover, the blood collecting device in the hemanalysis equipment of this invention is restricted to what is depended on two rollers -- not having -- for example, the knife of two sheets -- by the member of a **, as the skin is put, blood may be extruded, the member of the shape of two ring may be fastened around a finger, and blood may be extruded by narrowing spacing of the two rings.

[0022]
[Effect of the Invention] According to this invention, it can collect blood easily by the approach by suction, and blood can be analyzed that it is simple and quickly.

[Translation done.]

OPERATION

[Function] With the hemanalysis equipment of this invention which has the device in which it collects blood with a knockout means, and possesses a puncture member, an electrode, and a display The problem that it cannot decompress unless it sticks the base of the problem accompanying the approach of collecting blood by suction, i.e., a cylinder, on the skin, When the cylinder below phi1.5 mm is used, blood plugs up a hole. The problem that bleeding will stop, the problem that the structure of a syringe is complicated, etc. are solvable, and a general user cannot need skill, but can collect blood easily and quickly, and can analyze the detected matter.
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EXAMPLE

[Example] Hereafter, this invention is explained to a detail with reference to a drawing. The perspective view of hemanalysis equipment with an example of this invention is shown in drawing 1 . This hemanalysis equipment 1 has housing 2, the display 3, the main switch 4 and the reusable puncture needle discharge switch 5 which were formed in the field of 1 of that housing 2, and the puncture section 7 which extruded and was prepared between two rollers which were formed in other fields of housing 2, and which the roller section 6 and the extrusion roller section 6 have.
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[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view showing an example of the hemanalysis equipment of this invention.
[Drawing 2] It is drawing having shown the blood collecting device in the hemanalysis equipment of this invention in the detail.
[Drawing 3] It is drawing showing an example of the drive of the cartridge in the hemanalysis equipment of this invention, and a puncture member.
[Drawing 4] It is drawing showing the blood collecting member and reusable puncture needle in hemanalysis equipment of this invention.
[Drawing 5] It is drawing showing the condition that the blood collecting member in the hemanalysis equipment of this invention decomposed.
[Drawing 6] It is drawing showing the condition of extruding blood from the skin, with the roller in the hemanalysis equipment of this invention.
[Drawing 7] It is drawing showing other examples of the drive of the cartridge in the hemanalysis equipment of this invention, and a puncture member.
[Drawing 8] It is drawing showing the base and reusable puncture needle of a cartridge in the hemanalysis equipment of this invention. (a) It is drawing seen from the ******** side, and is (b). It is drawing showing the condition that the puncture cutting edge projected, and is (c). It is drawing seen from the electrode side, and is (d). It is drawing seen from back.
[Description of Notations]
1 -- Hemanalysis equipment 2 -- Housing
3 -- Display 4 -- Main switch
5 -- Reusable puncture needle discharge switch 6 -- Extrusion roller section
61 62 -- Roller 63 -- Motor
64 -- Shaft 7 -- Puncture section
71 -- Reusable puncture needle 72 -- Hammer
73 74 -- Spring 8 -- Sleeve
9 -- Blood collecting member 91 -- Wall
92 93 -- Electrode 94 -- Enzyme ink
95 -- Centrum 10 -- Cartridge
101 -- Base 102 -- Puncture Cutting Edge
103a -- Electrode 103b -- Electrode lead
104 -- Height 105 -- Flat Spring
106 -- Arm Member 107 -- Electromagnet

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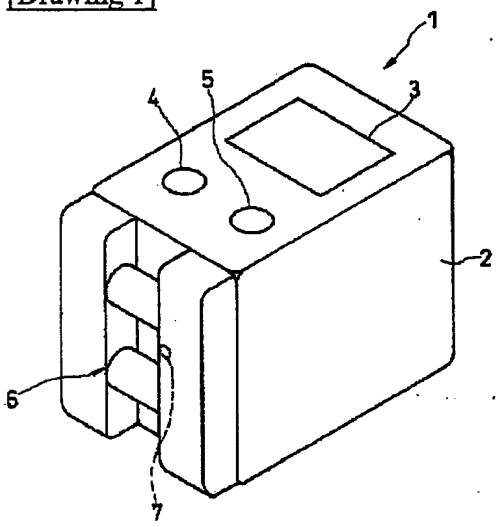
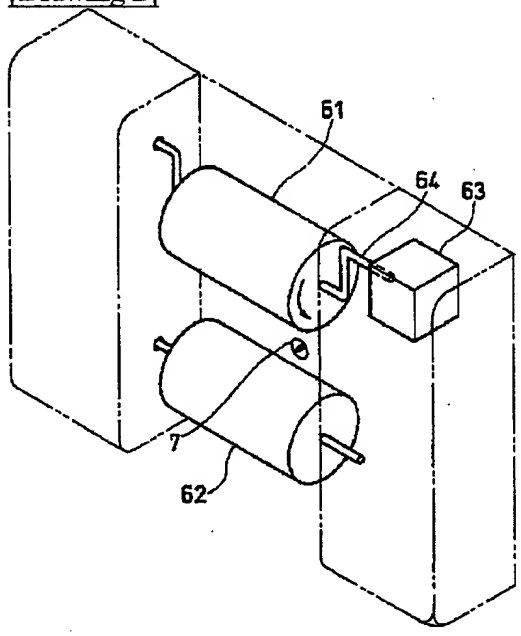
DRAWINGS

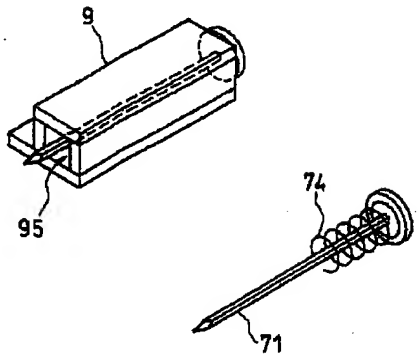
[Drawing 1]



[Drawing 2]



[Drawing 4]



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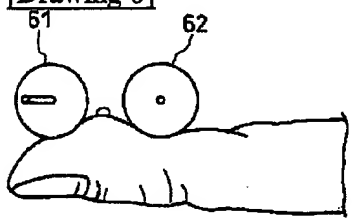

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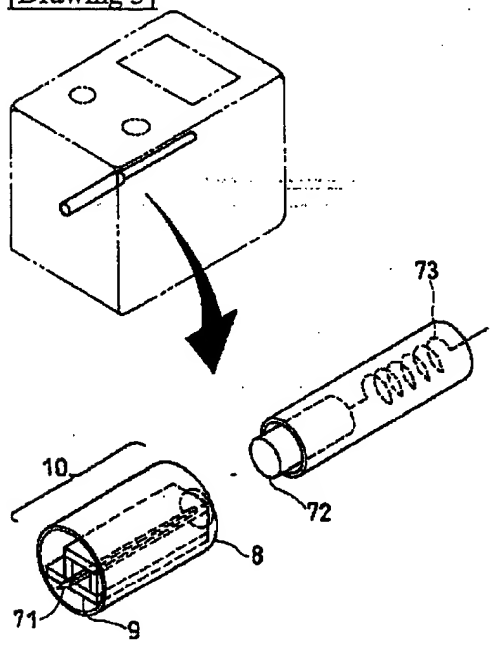
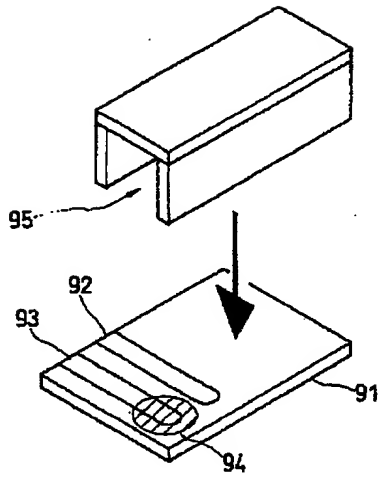
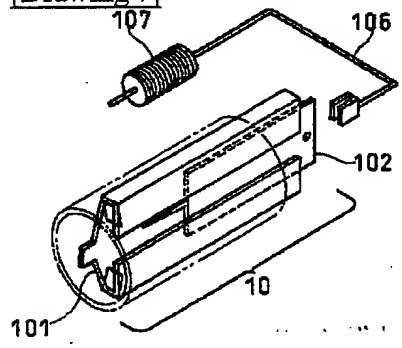


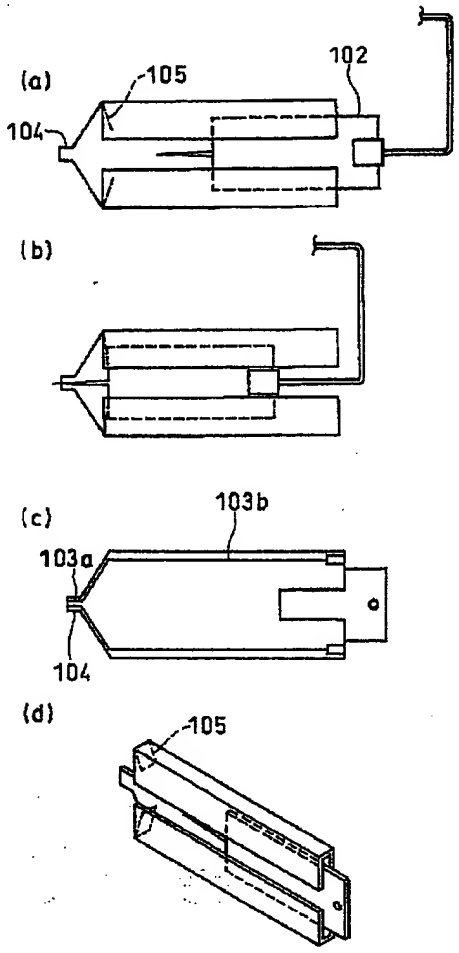
[Drawing 5]



[Drawing 7]



[Drawing 8]



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